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this means a Damascus-curved blade may be brought nearly straight. Blades made this way, in my brother's presence, when he was President of the regency in Cutch, were proved, previous to grinding, by striking at stones, ram-rods, musket-barrels, and even wheel-tires, without injury to the edge.

T. M. BAGNOLD.

No. XIII.

FINE ADJUSTMENT FOR THE STAGE OF A MICROSCOPE.

The SILVER ISIS MEDAL was presented to Mr. HUGH POWELL, 24 Clarendon-street, Somers' Town, for his fine Adjustment for the Stage of a Microscope; a Model of which has been placed in the Society's Repository.

THIS movement is applicable to any microscope, but, applied to one with a rack and pinion, the two give, with much simplicity, and in small compass, all that can be wanted in the adjustment of objects to the focus of the magnifying power. A rack and pinion (such as is now used) of forty teeth to an inch, will move the objects quick enough for low powers, and slow enough to bring objects in sight for the highest powers: then this very fine movement will give the most perfect adjustment, and this being

its chief purpose, a short range only is needed; one-twentieth of an inch is given, that range being enough either for adjustment, or for a micrometer.

The slow movement is produced by making the stage stand on three feet, under which three inclined planes are moved simultaneously by one screw. These inclined planes, or wedges, are made three-tenths of an inch long, and one-twentieth thick, and the screw has fifteen threads to this length; so one turn raises or lowers the stage only the three-hundredth part of an inch, and twenty divisions placed on the screw-head will give measures the 6000th part of an inch; and if finer than this is wanted, a finer screw or longer wedges will give it.

The following mode of constructing this slow movement is adopted, as one that may readily have all the other conveniences of a stage combined with it: here it is combined with Mr. Turrell's stage-movement, a full description of which is given in the first part of Vol. XLIX.

This stage is composed of two plates, *a b*, figs. 1, 2, 3, 4, 5: the lower plate *a* is to be attached to the microscope, and to have the wedges slide on it; the upper plate *b* is placed over this, it having three very short feet *eee* to stand on the wedges *fff*; and, as this plate must have no lateral motion, it is fitted to the under one by four pins *dd* passing through the holes *cc*; then, to make it close, or descend to the lower one when the wedges are withdrawn, springs *g*, fig. 3, are put on the pins, and secured by screws *h*; these constantly urge the plates together, as in fig. 5. The three wedges *f* are made in one piece, as shewn in fig. 1, with the end *i* turned up, to stand before the screw *j*; this screw, being fixed to the plate *b*, is allowed only to push the wedges *fff* under the feet *eee* to raise the stage, and, when the screw is withdrawn, the

wedge-plate *f* is urged to follow close against the screw-end by a spring in the little box *k*, which is screwed to the plate *b*, thus letting the stage descend. By this arrangement there is no shake, or loss of time, as it is frequently called; for the stage keeps close to the wedges by the uniform force of its springs, and the wedge-plate follows the screw *j* with an uniform force, which at once removes all end-shake, the spring *k* constantly pressing the wedge-plate and screw one way. Figs. 6 and 7 are section and end-view of the box *k*, shewing the spring and the plug *l* that acts against the wedge-plate exactly opposite the screw *j*. *m* is the micrometer-head, and *n* the index; it is screwed to the wedge-plate *f*, so it goes to and fro with the micrometer-head. The pins *o*, figs. 3 and 5, are merely those by which this stage is attached to its microscope. The milled heads *p p* and *q*, with the plates *r*, are parts of the lateral movement described in Vol. XLIX. The aperture *s* is the usual opening through which light is received from the mirror for transparent objects.

If the three inclined planes *f* are not made alike, it will give a sort of rolling motion to the object whilst being adjusted; therefore, care is needful on that account: but, when used as a micrometer, a degree of perfection is requisite that will need a tool by which the workman can command the exact inclination of the planes, and the exact similarity of them; for equal divisions on the screw-head will not indicate any known measures unless the inclination of the planes is accurately determined.